Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of the claims in the application.

Listing of Claims:

1. (Original) A phase shift device, comprising: a first superconducting terminal, having a first phase; a second superconducting terminal, having a second phase; and a phase shifter, coupled to the first superconducting terminal and to the second superconducting terminal, wherein the phase shifter is capable of causing a predefined difference between the first phase and the second phase.

2. (Original) The phase shift device of claim 1, wherein the phase shifter comprises an anisotropic superconductor.

3. (Original) The phase shift device of claim 2, wherein the anisotropic superconductor is a d-wave superconductor.

4. (Currently amended) The phase shift device of claim 1 ~~2~~, wherein the first superconducting terminal and the second superconducting terminal comprise s-wave superconductors.

5. (Original) The phase shift device of claim 2, wherein the anisotropic superconductor is coupled to the first superconducting terminal through a first side; and the anisotropic superconductor is coupled to the second superconducting terminal through a second side; wherein the first side and the second side define a mismatch angle.

6. (Original) The phase shift device of claim 5, wherein the mismatch angle is about 90 degrees.

7. (Currently amended) The phase shift device of claim 1 ~~2~~, wherein the phase shifter is electrically coupled to the first superconducting terminal through a first connector; and the phase shifter is electrically coupled to the second superconducting terminal through a second connector.

8. (Original) The phase shift device of claim 7, wherein the first superconducting terminal, the second superconducting terminal, the first connector, the second connector, and the phase shifter overlie a substrate.

9 - 11. (Cancelled)

12. (Currently amended) The phase shift device of claim 1 ~~2~~, wherein the coupling of the phase shifter and the first superconducting terminal comprises a first Josephson junction; and the coupling of the phase shifter and the second superconducting terminal comprises a second Josephson junction.

13. (Currently amended) The phase shift device of claim 7 ~~2~~, wherein the first superconducting terminal and the second superconducting terminal comprise niobium, aluminum, lead, or tin; the phase shifter comprises $YBa_2Cu_3O_{7-d}$, wherein d has a value between ~~about~~ 0 and ~~about~~ 0.6; and the first connector and the second connector comprise gold, silver, or platinum.

14. (Currently amended) The phase shift device of claim 1 ~~2~~, wherein the phase shifter comprises [[:]] a plurality of anisotropic superconductors.

15. (Currently amended) The phase shift device of claim 1 ~~14~~, wherein the phase shifter comprises [[:]] a first anisotropic superconductor [[;]] and a second anisotropic superconductor, wherein the first superconductor and the second superconductor are coupled by a Josephson-junction.

16. (Currently amended) The phase shift device of claim 15, wherein the Josephson-junction comprises [[:]] a grain boundary.

17. (Original) The phase shift device of claim 15, wherein the first anisotropic superconductor has a first order parameter with a first orientation, and the second anisotropic superconductor has a second order parameter with a second orientation, wherein the first orientation and the second orientation define a mismatch angle.

18. (Original) The phase shifter device of claim 17, wherein the mismatch angle is about 45 degrees.

19. (Original) The phase shift device of claim 15, wherein the first anisotropic superconductor and the second anisotropic superconductor overlie a substrate.

20. (Original) The phase shift device of claim 19, wherein the first connector overlies the first anisotropic superconductor; and the second connector overlies the second anisotropic superconductor.

21. (Original) The phase shift device of claim 20, wherein the first superconducting terminal overlies the first connector; and the second superconducting terminal overlies the second connector.

22 - 54. (Cancelled)

55. (Currently amended) The phase shift ~~circuitry~~ device of claim 1 ~~41~~, wherein ~~the superconducting circuitry comprises:~~ quantum computing circuitry is coupled to the phase shift device.

56 - 58. (Cancelled)

59. (Currently amended) A phase shifter chip [[,]] comprising:

a plurality of phase shift devices, each respective phase shift device in the plurality of ~~the~~ phase shift devices ~~individually~~ comprising:

a first superconducting terminal, having a first phase;

a second superconducting terminal, having a second phase; and

a phase shifter, coupled to the first superconducting terminal and to the second superconducting terminal, wherein the phase shifter is capable of causing a predefined difference between the first phase and the second phase; and

superconducting circuitry, coupled to the plurality of phase shift devices.

60. (Currently amended) The phase shifter chip of claim 59, wherein a phase shifter in a phase shift device in the plurality of phase shift devices comprises ~~the phase shifters individually comprise:~~ an anisotropic superconductor.

61. (Currently amended) The phase shifter chip of claim 59, wherein ~~the~~ a first superconducting ~~terminals~~ terminal and ~~the~~ a second superconducting ~~terminals comprise~~ terminal in a phase shift device in the plurality of phase shift devices is made of niobium, aluminum, lead, or tin; and a phase shifter in the phase shift device is made of ~~the phase shifters individually comprise~~ $YBa_2Cu_3O_{7-d}$, wherein d has a value between ~~about~~ 0 and ~~about~~ 0.6.

62. (Currently amended) The phase shifter chip of claim 59, wherein a phase shifter in a phase shift device in the plurality of phase shifters comprises: ~~the phase shifters individually comprise:~~

a first anisotropic superconductor, having a first order parameter with a first orientation; and

a second anisotropic superconductor, having a second order parameter with a second orientation, wherein the first orientation and the second orientation define a mismatch angle.

63. (Original) The phase shifter chip of claim 62, wherein the mismatch angle is about 45 degrees.

64. (Currently amended) The phase shifter chip of claim 62 ~~59~~, wherein ~~in the individual phase shifters~~ the first anisotropic ~~superconductors~~ superconducter and the second anisotropic ~~superconductors~~ superconductor are coupled by a Josephson-junction.

65. (Currently amended) The phase shifter chip of claim 64, wherein the Josephson ~~junctions~~ junction ~~comprise~~ comprises a grain boundary.

66. (Currently amended) The phase shifter chip of claim 62 ~~59~~, wherein ~~in the individual phase shift devices~~

the first anisotropic superconductor and the second anisotropic superconductor overlie a substrate;

the first superconducting terminal in the phase shift device in the plurality of phase shifters overlies the first anisotropic superconductor; and

the second superconducting terminal in the phase shift device in the plurality of phase shifters overlies the second anisotropic superconductor.

67. (Currently amended) The phase shifter chip of claim 59, wherein

the plurality of phase shift devices overlie a substrate;

the superconducting circuitry overlies the plurality of phase shift devices; and

~~the individual~~ a phase shift ~~devices~~ device in the plurality of phase shift devices is ~~are~~ coupled to the superconducting circuitry by a first contact ~~terminals~~ terminal and a second contact terminal.

68. (Currently amended) The phase shifter chip of claim 67, wherein an insulating layer separates the plurality of phase shift devices and the superconducting circuitry, and wherein ~~in the individual phase shift devices~~ the first contact terminal and the second contact terminal couples the superconducting circuitry and the ~~individual~~ phase shift device in the plurality of phase shift devices through a first opening and a second opening in the insulating layer, respectively.

69. (Currently amended) The phase shifter chip of claim 59, wherein

the superconducting circuitry overlies a substrate;

the plurality of phase shift devices overlie the superconducting circuitry; and

a ~~the individual~~ phase shift ~~devices~~ device in the plurality of phase shift devices is ~~are~~ coupled to the superconducting circuitry by a first contact ~~terminals~~ terminal and a second contact terminal ~~terminals~~.

70. (Currently amended) The phase shifter chip of claim 69, wherein an insulating layer separates the plurality of phase shift devices and the superconducting circuitry, wherein ~~in the individual phase shift devices~~ the first contact terminal and the second contact terminal ~~couples~~ couple the superconducting circuitry and the ~~individual~~ phase shift device in the plurality of phase shift devices through a first opening and a second opening in the insulating layer, respectively.

71. (Currently amended) The phase shifter chip of claim 59, wherein the superconducting circuitry comprises [[:]] quantum computing circuitry.

72. (Original) A phase shifter chip, comprising: a plurality of phase shift device means, the individual phase shift devices comprising: a first superconducting terminal means, having a first phase; a second superconducting terminal means, having a second phase; and a phase shifter means, coupled to the first and second superconducting terminal means, capable of causing a predefined difference between the first phase and the second phase; and a superconducting circuitry means, coupled to the plurality of phase shifting means.

73. (Original) A method of making a phase shifter chip, the method comprising: forming a substrate with a first crystal axis orientation; forming a seed layer with a second crystal axis orientation, overlying the substrate, wherein the second crystal axis orientation is different from the first crystal axis orientation, forming a plurality of openings in the seed layer; and forming a plurality of phase shift devices overlying the plurality of openings.

74. (Original) The method of claim 73, wherein the forming of a plurality of phase shift devices comprises: forming a plurality of first anisotropic superconductors over the plurality of openings; and forming a plurality of second anisotropic superconductors over the seed layer.

75. (Original) The method of claim 74, wherein the forming of a plurality of phase shift devices comprises: forming a plurality of first anisotropic superconductors, having first order parameters with a first orientation; and forming a plurality of second anisotropic superconductors, having second order parameters with a second orientation, wherein the first orientation is determined by the first crystal axis orientation; and the second orientation is determined by the second crystal axis orientation.